

## REMARKS

Entry of the foregoing amendments is respectfully requested.

### Summary of Amendments

Upon entry of the foregoing amendments, claims 54, 66 and 70 are amended, claims 64, 65, 69 and 72-80 are cancelled and claims 81-92 are added, whereby claims 51-63, 66-68, 70, 71 and 81-92 will be pending, with claim 51 being the only independent claim.

Support for the new claims can be found throughout the present specification (see, e.g., page 15) and in the cancelled claims.

Applicants emphasize that the cancellation of claims 64, 65, 69 and 72-80 is without prejudice or disclaimer, and Applicants expressly reserve the right to prosecute the cancelled claims in one or more continuation and/or divisional applications.

### Summary of Office Action

Claim 54 is objected to because of a typographical error.

Claims 51, 52, 55-60, 64, 65 and 67-80 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mennig et al., U.S. Patent No. 6,455,103 (hereafter "MENNIG"), in view of Edwards, U.S. Patent No. 3,493,289 (hereafter "EDWARDS").

Claims 53 and 63 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of Arney et al., U.S. Patent No. 6,493,289 (hereafter "ARNEY").

Claim 54 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of Landau, U.S. Patent No. 4,188,444 (hereafter "LANDAU").

Claim 62 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of Zimmermann et al., US 2002/0017452 (hereafter "ZIMMERMANN").

Claims 61 and 66 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of Forrest et al., U.S. Patent No. 6,091,195 (hereafter "FORREST").

#### **Response to Office Action**

Reconsideration and withdrawal of the objection and rejections of record are respectfully requested, in view of the foregoing amendments and the following remarks.

#### ***Response to Objection to Claim 54***

Claim 54 is objected to because of a typographical error.

Applicants note that the typographical error in claim 54 has been corrected, thereby rendering this objection moot.

#### ***Response to Rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS***

Claims 51, 52, 55-60, 64, 65 and 67-80 are rejected under 35 U.S.C. § 103(a) as allegedly

being unpatentable over MENNIG in view of EDWARDS. The rejection essentially alleges that MENNIG discloses or renders obvious the elements of the claimed substrate with the exception that MENNIG fails to disclose a crystalline transparent substrate, such as quartz. In this regard, the Examiner takes the position that EDWARDS cures the noted deficiencies of MENNIG.

Applicants respectfully traverse this rejection for all of the reasons which are set forth in the response to the previous Office Action. The corresponding remarks are expressly incorporated herein.

It further is pointed out that the process of MENNIG includes a one-step thermal densification of the multilayer system and removal of the organic constituents present by baking (see, e.g., col. 2, lines 1-3 of MENNIG). Further, according to col. 7, lines 55-61 of MENNIG, this baking step is carried out at high temperatures, i.e., at least 400° C. According to Examples 5 to 7 of MENNIG a temperature of 450° C was employed for 10 minutes.

While it is apparent that glass (employed as the only substrate material in MENNIG) will withstand such drastic conditions, it is by no means clear that any other materials which may otherwise be considered to be suitable as substrate materials for optical systems are able to withstand the baking conditions taught by MENNIG as well.

It further is not seen that the additional documents relied upon by the Examiner in the instant Office Action teach or suggest that the materials mentioned therein (with the exception of glass) would also be suitable for the process of MENNIG.

In particular, the process of EDWARDS merely involves a thermal deposition of a material such as manganese sulfide onto a substrate material. To be suitable for this process, the substrate

material clearly does not have to be particularly heat-resistant. This is evidenced, for example, by the fact that in addition to glass (i.e., the only substrate material used in the Examples of EDWARDS) and quartz, also plastic materials such as polyvinylbutyral are suitable as substrate materials for the process of EDWARDS (see, e.g., col. 4, lines 54-57).

Applicants submit that for at least all of the foregoing reasons, there is no apparent reason for one of ordinary skill in the art to replace glass by a material such as quartz in the process of MENNIG, i.e., a process which clearly requires a material which can withstand temperatures of at least 400° C for extended periods of time.

In view of the foregoing, the instant rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS is unwarranted and should be withdrawn, which action is respectfully requested.

***Response to Rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and ARNEY***

Claims 53 and 63 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of ARNEY. The rejection concedes that MENNIG and EDWARDS fail to teach a crystalline substrate comprising silicon and being a silicon wafer. In view thereof, the rejection relies on col. 10, lines 13-19 and col. 20, lines 33-34 of ARNEY and alleges that this document shows “a silicon wafer can be used as a glass substrate for optical applications. Therefore, glass and silicon are equivalents [*sic*] materials for use as a transparent substrate in an optical device.” Bottom of page 9 of the instant Office Action.

Applicants respectfully traverse this rejection as well. In particular, in contrast to what is alleged by the Examiner, only glass, plastic and metals are mentioned as suitable substrate materials in col. 10, lines 16-17 of ARNEY. While it is correct that in Test Procedure 3 of ARNEY a silicon wafer is used as a substrate material, it is pointed out that in this case the substrate is only used in order to determine the refractive index of the creamer, i.e., for testing purposes and not in order to produce an actual optical device.

It also is apparent that in Test Procedure 3 the heating conditions were much less severe than in the case of the process of MENNIG (only a curing step for 2 hours at 80° C is mentioned in col. 20, lines 39-40 of ARNEY). Accordingly, even if one were to assume, *arguendo*, that ARNEY teaches that a silicon wafer can in general replace glass as substrate material for optical applications, ARNEY clearly fails to teach or suggest that a silicon wafer can withstand the drastic heat treatment (baking) conditions required in the process of MENNIG.

Applicants submit that for at least all of the foregoing reasons, there is no apparent reason for one of ordinary skill in the art to replace glass by a material such as a silicon wafer in the process of MENNIG, i.e., a process which clearly requires a material which can withstand temperatures of at least 400° C for extended periods of time.

In view of the foregoing, the instant rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and ARNEY is without merit, wherefore withdrawal thereof is warranted as well.

***Response to Rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and LANDAU***

Claim 54 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of LANDAU. The rejection concedes that MENNIG and EDWARDS both fail to teach a crystalline substrate comprising PbS or selenium, but alleges that LANDAU teaches that glass can contain selenium in order to form an optical glass wherefore it would allegedly have been obvious “to include selenium as suggested by Landau in order to provide a transparent crystalline glass substrate for an optical system.” Bottom of page 10 of the instant Office Action.

This rejection is respectfully traversed as well. In particular, the only substrate material mentioned in LANDAU is glass (see, e.g., title and abstract of LANDAU). While it is correct that LANDAU mentions in col. 2, lines 63-64 that the glass may contain small quantities of selenium, the glass is still a glass, i.e., not a crystalline substrate.

In this regard, it is noted that in contrast to what is alleged by the Examiner, glass is not crystalline. For example, according to, e.g., <http://en.wikipedia.org/wiki/Glass>:

Glass is an amorphous (non-crystalline) solid material. Glasses are typically brittle, and often optically transparent.

Accordingly, even if the glass of LANDAU were assumed to contain small quantities of selenium, it would not be a crystalline substrate. For this reason alone, MENNIG in view of EDWARDS and LANDAU is unable to render obvious the subject matter of instant claim 54, thereby clearly warranting withdrawal of the instant rejection.

***Response to Rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and ZIMMERMANN***

Claim 62 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of ZIMMERMANN. The rejection concedes that MENNIG and EDWARDS both fail to teach a crystalline substrate comprising a watchglass of sapphire but essentially alleges that this deficiency is cured by ZIMMERMANN.

Applicants respectfully traverse this rejection as well. While ZIMMERMANN mentions sapphire glass as an example of a substrate that can be provided with an antireflection coating, the situation is similar to that set forth above with respect to the rejection over MENNIG in view of EDWARDS. In particular, there is no indication whatsoever in ZIMMERMANN that sapphire glass would be able to withstand the drastic heat treatment (baking) conditions described for the last step of the process of MENNIG.

In this regard, it is noted that according to, e.g., paragraph [0010] of ZIMMERMANN, the coating on the substrate is essentially produced by sputtering. It is apparent to one of ordinary skill in the art that sputtering does not require a particularly high thermal stability of the substrate. In fact, sputtering conditions do not usually involve subjecting the substrate to an elevated temperature at all.

Applicants submit that for at least all of the foregoing reasons, there is no apparent reason for one of ordinary skill in the art to replace regular glass by a material such as sapphire glass in the process of MENNIG, i.e., a process which clearly requires a material which can withstand temperatures of at least 400° C for extended periods of time.

In view of the foregoing, the instant rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and ZIMMERMANN also is without merit and should be withdrawn, which

action is respectfully requested.

***Response to Rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and FORREST***

Claims 61 and 66 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over MENNIG in view of EDWARDS and further in view of FORREST. Regarding claim 61 the rejection concedes that MENNIG and EDWARDS both fail to teach a crystalline substrate comprising a sheet of sapphire but essentially alleges that this deficiency is cured by FORREST.

Applicants respectfully traverse this rejection as well. While FORREST mentions sapphire in addition to glass, quartz, and plastic as examples of transparent substrates that can be provided with pixels, the situation is similar to that set forth above with respect to the rejections over MENNIG in view of EDWARDS and over MENNIG in view of EDWARDS and ZIMMERMANN.

In particular, there is no indication whatsoever in FORREST that the material for the substrate mentioned therein should be able to withstand the drastic heat treatment (baking) conditions described for the last step of the process of MENNIG.

In this regard, it further is pointed out that the fact that FORREST mentions plastic as an example of a suitable substrate material (col. 4, line 37) is a clear indication that the substrate does not have to be particularly resistant to heat at all.

Applicants submit that for at least all of the foregoing reasons, there is no apparent reason for one of ordinary skill in the art to replace regular glass by a material such as sapphire glass in the process of MENNIG, i.e., a process which clearly requires a material which can withstand temperatures of at least 400° C for extended periods of time.



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For at least the foregoing reasons, the instant rejection under 35 U.S.C. § 103(a) over MENNIG in view of EDWARDS and FORREST is without merit as well, wherefore withdrawal thereof is warranted and respectfully requested.

### CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are in condition for allowance, wherefore an early issuance of the Notices of Allowance and Allowability is respectfully solicited. If any issues yet remain which can be resolved by a telephone conference, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,  
Mohammad JILAVI et al.

/Heribert F. Muensterer/  
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Heribert F. Muensterer  
Reg. No. 50,417

January 21, 2011  
GREENBLUM & BERNSTEIN, P.L.C.  
1950 Roland Clarke Place  
Reston, VA 20191  
(703) 716-1191